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A new genus of Plumariidae, with notes on the relationships among the genera of the family

(Hymenoptera, Chrysidoidea, Plumariidae)

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Abstract

Maplurius spatulifer, a new genus and species from the xeric areas of western and southern Argentina, is described. The phylogenetic analysis suggests that the relationships among the genera of Plumariidae are: *(((Plumaroides + Maplurius) Myrmecopterinella) (Plumarius + Myrmecopterina))*.

Introduction

The Plumariidae was a family of uncertain position until the studies of BROTHERS (1974, 1975) clearly established the chrysidoid affinities of these wasps. Later KÖNIGSMANN (1978), CARPENTER (1986), and BROTHERS & CARPENTER (1993) discussed the relationships of the family within the Chrysidoidea. The family comprises the South American genera *Plumarius* PHILIPPI and *Plumaroides* BROTHERS, and the southern African genera *Myrmecopterina* BISCHOFF and *Myrmecopterinella* DAY. The purpose of the present contribution is to describe a new genus from the xeric areas of western and southern Argentina, and to discuss its phylogenetic relationships. All the genera of the family, including the new one described below, are based on male specimens. Plumariid males are conspicuous elements of the nocturnal wasp fauna in southern South America, and are frequently collected. To the contrary, the apterous females have seldom been collected, the few described specimens having been placed in the genus *Plumarius* (EVANS 1966; PEREZ D'ANGELO 1974). Females of the African genera are as yet unknown.

The phylogenetic study of the five genera revealed that, contrary to what their names may suggest, *Plumaroides* is not closely related to *Plumarius*, nor *Myrmecopterinella* to *Myrmecopterina*. The evidence presented here indicates that the new genus together with *Plumaroides* and *Myrmecopterinella* form the sister clade to the remaining two genera. The Plumariidae has thus two distinct lineages, each represented both in the American and the African continents.

Phylogenetic Analysis

Phylogenetic inferences are based on the study of specimens of *Maplurius spatulifer* ROIG-ALSINA, *Myrmecopterina filicornis* BISCHOFF, *Myrmecopterina* sp., *Plumarius hirticornis* (ANDRÉ), *Plumarius striaticeps* (ANDRÉ), *Plumarius* spp., and *Plumaroides andalgalensis* BROTHERS. I have not examined specimens of *Myrmecopterinella*; character states for this genus have been taken from its description and drawings (DAY 1977).

The character analysis was made taking into account the studies of BROTHERS (1975), CARPENTER (1986), and BROTHERS & CARPENTER (1993) which conclude that the Plumariidae is the sister group to all extant chrysidoid wasps. The polarity of the characters was established taking into account the plesiomorphic states for the Chrysidoidea as proposed by CARPENTER (1986), and the plesiomorphic states for the Aculeata as proposed by BROTHERS (1975). Characters not studied by these authors were polarized considering for outgroup comparison the other families of Chrysidoidea.

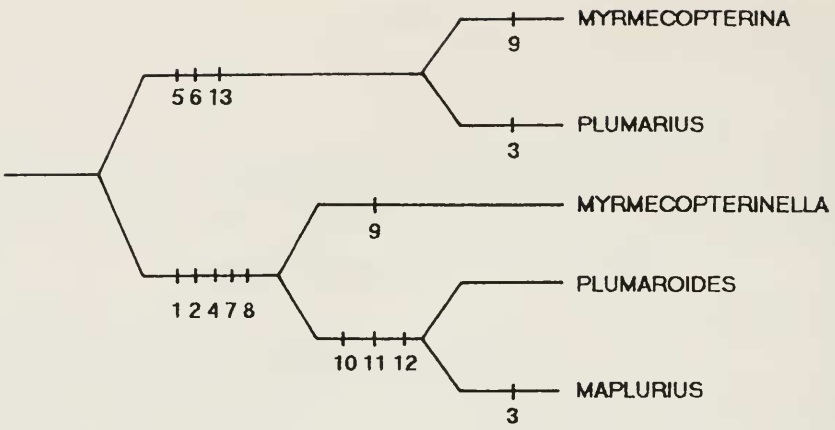


Fig. 1: Relationships among the genera of Plumariidae.

The analysis is based on 13 characters, listed below. For each character the apomorphic state is indicated in boldface. A single tree results (Fig. 1).

BROTHERS (1974, Fig. 3) presented a drawing of the hind wing of *Myrmecopterina filicornis* BISCHOFF with an incomplete costal vein. This feature was later mentioned by DAY (1977) for *Myrmecopterinella*, suggesting that it associated the two African genera. The specimens of *Myrmecopterina* I have examined have a complete costal vein. Although the vein is narrow, it is not narrower than that of *Plumarius* or *Plumaroides*.

1. **Labial palpus with reduced number of segments.** The plesiomorphic condition in the Plumariidae is a 3-segmented palpus (CARPENTER 1986). This condition is present in *Plumarius* and *Myrmecopterina*. The palpus has undergone reduction to 2 segments *(Plumaroides)*, 1 segment *(Maplurius)*, and palpus absent (*Myrmecopterinella*). Since each of the last three genera is autapomorphic for different degrees of reduction, the apomorphous condition is understood as "less than three segments".
2. **Maxillary palpus with reduced number of segments.** The plesiomorphic condition, a 6-segmented palpus, is present in *Plumarius* and *Myrmecopterina*. The palpus is reduced to 5 segments in *Plumaroides* and *Maplurius*, and to 3 segments in *Myrmecopterinella*.
3. **Antennal pedicel and flagellomeres 1-10 with transverse rows of long setae on ventral surface.** This characteristic is not known in the outgroups, and unites *Plumarius* and *Maplurius*.
4. **Pronotal collar absent.** A plesiomorphic collar (BROTHERS 1975), although more reduced than in other aculeates, is distinct in *Plumarius* and *Myrmecopterina*. Their collar forms a horizontal surface which along the midline is 1/3 to 1/2 as long as the vertical surface of the pronotum, and is set off by a profound, distinct sulcus. The other three genera have at most a narrow flange set off by a dark line.
5. **Ventral angle of pronotum pointed.** A pronotum with a plesiomorphic round ventral angle (BROTHERS 1975) is present in *Myrmecopterinella*, *Maplurius* and *Plumaroides*. The pronotum is elongate ventrally in *Plumarius* and *Myrmecopterina*; the ventral angle is pointed and slightly directed mesally.
6. **Anterior portions of propleura expanded dorsally forming a tubular neck.** In the plesiomorphic condition the dorsal area between the propleural sclerites is membranous. In *Plumarius* and *Myrmecopterina* the anterior 1/4 to 1/5 of the propleural sclerites come together along the dorsal midline forming a tubular neck which conceals most of the occipital processes.
7. **Epimeral area of propleuron absent.** A distinct pleural area above the forecoxa set off by a sulcus is present in some plumariids *(Plumarius* and *Myrmecopterina)*, scolebythids (EVANS 1963), and several other chrysidoids, representing the plesiomorphic condition for the Chrysidoidea. Such area is lost in *Plumaroides*, *Maplurius* and *Myrmecopterinella*.
8. **Prepectus reduced.** A well developed prepectus represents the plesiomorphic condition (BROTHERS 1975). Such a prepectus is present in *Plumarius* and *Myrmecopterina*: it extends downwards to almost the ventral midline, is broadest medially, has carinate margins, and usually bears several transverse wrinkles. *Myrmecopterinella* has the prepectus reduced to a slender bar (DAY 1977). *Plumaroides* and

Maplurius also have a reduced prepectus, the upper half being narrow, broadest at the top, and the lower half being filiform.

9. **Second submarginal cell reduced to absent.** The plesiomorphic condition in the Plumariidae is 2 submarginal cells present (CARPENTER 1986). The second submarginal cell varies form moderate to extremely reduced in specimens of *Myrmecopterina*, while it is absent in *Myrmecopterinella*. This tendency in reduction of wing venation has been mentioned as suggestive of relationship between the two South African genera (DAY 1977).
10. **Vannal lobe of hind wing more than twice as long as submedian cell.** An exceedingly large vannal lobe coupled with a short submedian cell is a characteristic not present in the outgroups, that unites *Plumaroides* and *Maplurius*.
11. **Arolia of mid and hind tarsi absent.** Arolia present in all legs is the plesiomorphic condition. Their absence unites *Plumaroides* and *Maplurius*.
12. **First metasomal sternum with a median longitudinal keel.** This feature is not known in the outgroups, and unites *Plumaroides* and *Maplurius*.
13. **Ventral surface of hind coxae with a specialized area of setae.** This unique feature unites *Plumarius* and *Myrmecopterina*. Transverse sections of the hind coxa of *Plumarius hirticornis* (ANDRÉ) show that the integument which corresponds to the setose area is lined internally with a layer of probably glandular tissue.

Key to genera of Plumariid males

1. First metasomal tergum with distinct anterior vertical surface. First metasomal sternum with basal longitudinal keel. Vannal lobe of hind wing over twice (2.25-2.35) as long as submedian cell. Arolia of mid and hind legs absent 2
– First metasomal tergum evenly rounded, without a distinct anterior vertical surface. First metasomal sternum not keeled. Vannal lobe of hind wing 1.35-1.65 times as long as submedian cell. Arolia of mid and hind legs present 3

2. Antennal flagellomeres with short appressed hairs. Scape without projection. Hypoepimeral area of mesepisternum defined anteriorly and inferiorly by distinct lines. First nebulous vein of forewing arising near posterior angle of marginal cell ..... *Plumaroides*
– Antennal flagellomeres on ventral surface with strong, erect hairs, as long as width of flagellomeres. Scape with strong ventral projection, as long as apical width of scape. Hypoepimeral area of mesepisternum limited only inferiorly by line running from scrobal pit to pleural suture. First nebulous vein of forewing arising near middle of marginal cell ..... *Maplurius* gen. n.

3. Propleuron without distinct epimeral area. Mid tibial spurs absent. Scutellum raised into dorsal projection. Occipital carina absent ..... *Myrmecopterinella*
– Propleuron with epimeral area distinct, delimited by furrow. Mid tibial spurs present. Scutellum not raised dorsally, in lateral view at same level of scutum and metanotum. Occipital carina present ... 4

4. Antennal flagellomeres with long hairs 3 or more times as long as width of flagellomeres, and set in transverse rows. Antennal socket separated from epistomal suture by more than one socket diameter. Malar space long, at least 0.3 times height of eye ..... *Plumarius*
– Antennal flagellomeres with hairs scattered, approximately as long as width of flagellomeres. Antennal socket separated from epistomal suture by less than one socket diameter. Malar space short, less than 0.1 times height of eye ..... *Myrmecopterina*

Maplurius gen. n.

Type species: *Maplurius spatulifer* sp. n.

This genus is closely related to *Plumaroides*, from which it differs in several apomorphic characters: the antenna bears transverse rows of long setae, the labial palpus is 1-segmented, the scape has a strong ventral projection, and the hind femur is projected at each side of the tibial articulation. *Plumaroides* is apomorphic

regarding *Maplurius* in the following characters: the clypeus is emarginate and its margin is bent backwards, the posterolateral angle of the pronotum is notched, and the first nebulous vein of the forewing arises near the posterior margin of the marginal cell.

Description:

Head: Frons convex, protuberant between antennal sockets. Ocelli small, set in shallow depressions. Eye protuberant, hemispherical. Gena narrow. Occipital carina absent. Malar space short, approximately as long as 0.25 times basal width of mandible. Antennal sockets widely separated, low on face. Antenna with 11 falgellomeres; scape short, with strong ventral projection; pedicel and flagellomeres on ventral surface with strong, erect setae, as long as width of flagellomeres; setae on pedicel and flagellomeres 1-10 set in transverse rows. Clypeus transverse, apical margin slightly produced medially. Mandible with acute apex and two preapical teeth on inner margin. Maxillary palpus 5-segmented. Labial palpus consisting in one minute segment.

Thorax: Pronotum medially forming short vertical band with minute lower flange representing reduced collar; posterolateral angle truncate; ventral angle rounded. Propleuron produced anteriorly beyond pronotum; dorsal area between propleural sclerites membranous; distinct epimeral area absent. Prosternum briefly exposed ventrally, triangular. Mesoscutum transverse, wider than long, with distinct notauli and parapsidal lines; former confined to anterior vertical part of scutum. Prepectus present, hidden by pronotum, forming narrow sclerotized bar widest dorsally and tapering ventrally. Mesopleuron strongly convex; mesepisternal scrobe distinct; with line running through scrobe to pleural suture limiting hypoepimeral area inferiorly; mesepimeron indistinct. Mesoscutellum simple. Metapostnotum not depressed, forming transverse band narrowed toward propodeal spiracula.

Wings: As in figure 2; first nebulous vein of forewing arising from middle of marginal cell; hind wing with short submedian cell and large vannal lobe. Legs slender. Tibial spurs 1-2-2; front spur finely pectinate, not tapering. Claws simple, arolium present only on foretarsus. Front and mid tibiae with few, weak spines; hind tibia with few inconspicuous spines; apex of hind femur projected at each side of tibial articulation. Propodeum short, transverse.

Metasoma: First tergum with distinct anterior vertical surface, in dorsal view longer than and nearly as wide as second. Metasoma widest at second tergum, then tapering caudally. Seventh tergum triangular, apically round; posterior margin forming strongly sclerotized, polished ridge. First sternum longer than second, basal $^2/_3$ with median longitudinal keel.

Etymology: The generic name is an anagram of *Plumarius*.

Maplurius spatulifer sp. n.

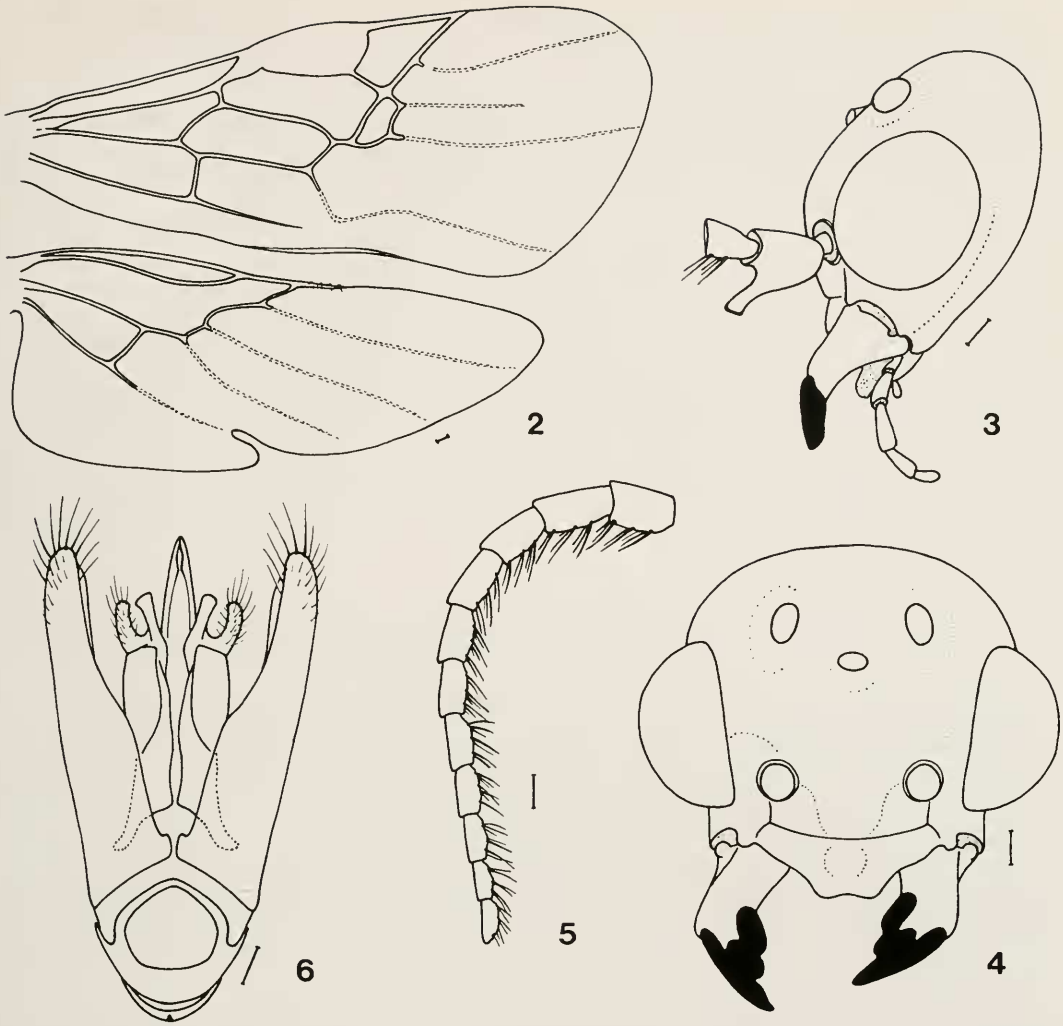
(Figs. 2-6)

Description of male holotype

Total length 6 mm; length of forewing 5.2 mm. Head, thorax, propodeum and sclerotized apical margin of seventh metasomal tergum dark brown; metasomal terga 1-5 brown with translucent hind margin and pale lateral subapical streaks; antennae, palpi, legs, metasomal terga 6-7, and sterna light brown. Wings translucent, iridescent; veins whitish, pterostigma brown. Hairs inconspicuous, appressed, scattered on head and thorax, moderately dense on legs and metasoma; with few long hairs on clypeus, pronotum and metasomal sterna. Integument with minute punctures, polished. Vertex of head not impressed medially. Proportion of postocellar distance to ocellocular distance 1.86:1. Proportion of interantennal distance to antennocular distance 4:1. Malar space 0.3 times basal width of mandible. Projection of scape spatulate. Proportions of scape, pedicel, and first three flagellomeres, 1.6:1:1.4:1.4:1.4. Flagellomeres 1-10 with large placoid sensillae. Outer spur of hind leg 0.45 times as long as hind basitarsus. Genitalia, figure 6.

Material studied: Holotype male from Argentina, San Juan Province, Guayamas, 14-I-1979, A. ROIG A., at light (Museo Argentino de Ciencias Naturales, Buenos Aires).

Two specimens from Argentina, Chubut Province, Trelew, 18-I-1968, J. and L. STANGE (Instituto Miguel Lillo, Tucumán), differ from the holotype in several respects and may represent a different species. They are much smaller, 3.2-3.4 mm long, the projection of the scape is cylindrical, not spatulate, the flagellomeres and the hind tibial spur are proportionally shorter, and the vertex of the head has a median



Figs. 2-6: *Maplurius spatulifer* sp. n., male holotype. 2. Wings. 3. Head, lateral view, showing antennal scape and pedicel. 4. Face. 5. Antennal flagellum. 6. Genital capsule. Scale lines = 1 mm.

longitudinal depression bearing a black line. A third specimen, in poor condition but definitely belonging to the genus, comes from Salta Province, El Barrial ca. San Carlos, 30-I-1981, A. ROIG A., at light (Museo Argentino de Ciencias Naturales, Buenos Aires).

Literature

BROTHERS, D. J. 1974: The genera of Plumariidae, with description of a new genus and species from Argentina (Hymenoptera: Bethyloidea). - J. Entomol. Soc. sth. Afr. **37**, 351-356.

– – 1975: Phylogeny and classification of the aculeate Hymenoptera, with special reference to the Mutillidae. - Univ. Kansas Sci. Bull. **50**, 483-648.

BROTHERS, D. J., CARPENTER, J. M. 1993: Phylogeny of Aculeata: Chrysidoidea and Vespoidea. - J. Hym. Res. **2**, 227-304.

CARPENTER, J. M. 1986: Cladistics of the Chrysidoidea (Hymenoptera). - J. New York Entomol. Soc. **94**, 303-330.

DAY, M. C. 1977: A new genus of Plumariidae from southern Africa, with notes on the Scolebythidae (Hymenoptera: Chrysidoidea). - Cimbebasia (A) **4**, 171-177.
EVANS, H. E. 1963: A new family of wasps. - Psyche **70**, 7-16.
– – 1966: Discovery of the female *Plumarius* (Hymenoptera, Plumariidae). - Psyche **73**, 229-237.
KÖNIGSMANN, E. 1978: Das phylogenetische System der Hymenoptera. Teil 4: Aculeata (Unterordnung Apocrita). -Dtsch. Entomol. Z. (N.F.) **25**, 365-435.
PEREZ D'ANGELO, V. 1974: *Plumarius coquimbo* n. sp. y primer registro de la hembra de *Plumarius* para Chile (Hymenoptera, Plumariidae). - Rev. chilena Entomol. **8**, 139.

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